



Upcycling

Increase in Material + Energy Bioresources

- Source reduction of organic waste
- Restoration of degraded or depleted soils
- Long-term carbon sequestration (e.g., ground injection of bio-CH₄)

Recycling

Recovery of Energy and Material Bioresources

- Recovery of edible foods for human or other animal uses
- Compost or digestate usage that sustains soil structure and nutrients and that sequesters carbon to net-zero.

Downcycling

Recovery of Only Energy or Material Bioresources

- Use in transportation or to make electricity, steam, and/or heat
- Pipeline injection of bio-CH₄ to offset fossil-CH₄
- Compost or digestate usage that increases soil nutrients or carbon (but not both)

Discard (Wastage)

Loss of Resource Value

- Interment in landfill
- Incineration that reduces waste volume (then landfill)
- Extraction and combustion of fossil fuels